

WHAT IS CLAIMED IS:

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1. A method for withdrawing an encryption key from a key escrow database, comprising:

function pairs each paired with a corresponding token;

transmitting the set of N trap door encryption-decryption function pairs to a receiver;

randomly selecting at the receiver one of the trap

10 door encryption-decryption function pairs and the paired token;

adding randomization information to the selected trap door encryption-decryption function pair and the corresponding token;

encrypting a decrypt on key using the corresponding token with the randomly selected encryption-decryption function pair;

recording the created set of N trap door encryptiondecryption function pairs and the corresponding paired token;

recording the encrypted randomly selected trap door encryption-decryption function pair along with the decryption key in a key escrow database; and

inverting the created set of N trap door encryption-decryption function pairs and the encrypted randomly selected trap door encryption-decryption function pair along with the decryption key to identify the decryption key.

2. A method for withdrawing an encryption key from 30 a key escrow database as in Claim 1, further comprising:

encrypting the created set of N trap door, the encryption-decryption function pairs and the randomly

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selected trap door function along with the decryption key prior to recording in an escrow database.

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3. The method for withdrawing an encryption key from a key escrow database as in Claim 1, further comprising:

randomly selecting at the receiver an additional trap door encryption-decryption function pair and the paired token;

adding randomization information to the additional selected trap door encryption-decryption function pair and the corresponding token;

concatenating the results of the adding of randomization information to the additional selected trap door encryption-decryption function pair to the encryption of the randomly selected first trap door encryption-decryption function pair; and

encrypting the concatenating results using the encryption key from the second choice.

- 4. The method for withdrawing an encryption key from a key escrow database as in Claim 1 further comprising adding signature information to the selected trap door encryption-decryption function pair to distinguish valid subsequent decodings from invalid decodings.
- 5. The method for withdrawing an encryption key from a key escrow database as in Claim 1, wherein encrypting a selected trap door encryption-decryption function pair comprises calculating a cryptogram utilizing the corresponding token and including an encryption key along with randomization information, as

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well as additional information added for signature purposes.

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6. A method for withdrawing encryption keys from a key escrow database, comprising:

generating, in accordance with a selected encryption function, a set of N cryptogram/decryption key pairs, each pair having a corresponding token;

transmitting the set of N cryptogram/decryption key pairs to a receiver;

randomly selecting at the receiver one of the cryptogram/decryption key pairs along with the corresponding token;

decrypting the randomly selected cryptogram utilizing the corresponding token to obtain a corresponding encryption key;

generating a cryptogram utilizing the corresponding encryption key and comprising the selected token and randomization information;

recording in an escrow database the generated set of N cryptogram/decryption key pairs along with each corresponding token and the generated cryptogram based on the randomly selected cryptogram decryption key pair; and

inverting the recorded set of N cryptogram/decryption key pairs and the generated cryptogram to identify an encryption key from the key escrow database.

7. The method for withdrawing encryption keys from a key escrow database as in Claim 6, further comprising:

randomly selecting at the receiver one or more additional N cryptogram/decryption key pairs and corresponding tokens;

decrypting each cryptogram using the associated token of the additionally selected encryption/decryption

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key pairs to identify a corresponding encryption key for each additionally selected pair;

cryptogram for generating a response/ each additionally selected cryptdgram/decryption key utilizing the corresponding excryption key and comprising the selected token and random/ization information; and

mixing the token information from one selected pair with the response cryptogram from a different selected pair along with randomization information to diffuse response structure prior to generating another response .cryptogram.

The method for withdrawing encryption keys from 8. a key escrow database as in Claim 6, further comprising:

decrypting the cryptogram of a cryptogram/decryption key pair using the associated decryption key to identify token information.

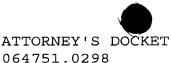
- The method $f \phi r$ withdrawing encryption keys from 9. a key escrow database as in Claim 8 wherein mixing comprises utilization of a linear transform.
- The method for withdrawing encryption keys from 20 a key escrow database as in Claim 8 wherein mixing comprises utilization of a symmetrical cryptosystem.
 - 11. The method for withdrawing encryption keys from a key escrow database as in Claim 8 wherein mixing comprises utilization further οf public a key cryptosystem.
 - 12. The method for withdrawing encryption keys from a key escrow database as in Claim 6 wherein recording in escrow database further comprises encrypting the generated set of N cryptogram decryption key pairs and the response message prior to recording.



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13. The method for withdrawing encryption keys from a key escrow database as in Claim 6 further comprising adding signature information to the response message to enable valid decodings to be distinguished from invalid decodings.

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14. A method for secure communication between an originator and a receiver using message encryption, comprising:

creating at an originator a set of N trap door functions each paired with a corresponding token, each trap door function comprising a cryptogram/decryption key pair;

transmitting the set of N trap door functions to a receiver;

randomly selecting at the receiver one of the trap door functions and the paired token;

adding randomization information to the corresponding token of the selected trap door function;

encrypting an escrow/key with the randomly selected trap door function;

transmitting the excrypted key with the randomly selected trap door function to the originator; and

decoding the encrypted escrow key with the randomly selected trap door function utilizing retained trap door information.

- 15. The process as in Claim 14 further comprising decrypting the cryptogram to identify the corresponding token utilizing the decryption key of the cryptogram/decryption key pair.
- 25 16. The method as in Claim 15 wherein encrypting an escrow key comprises generating a cryptogram comprising the corresponding token, the decryption key and randomization information.
- 17. The method of Claim 14 wherein decoding the comprises selecting a decryption key randomly from a selected group of decryption keys.

- 18. The method of Claim 17 further comprising recognizing a correct decoding result utilizing structural information embedded in the response message.
- 19. The method of Claim 14 wherein creating at an originator further comprises generating the set of N trap door functions utilizing a selected encryption function and a private encryption key.

Add 3